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Some Observations on An Outbreak of Distemper Amongst Army War Dogs

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Introduction

PRESENT-day evidence regarding the clinical picture of distemper occuring in the field, suggests that it is not such a clear-cut entity as it appears to have been in the past. The syndrome has kept changing over the years, which is a feature shared by certain other virus diseases, such as human influenza and measles.

In the case of distemper, it appears to be associated with the changeability of the virus itself (Larin & Hodgman, 1954) and bacterial complications. Other infections can influence the clinical picture, such as canine virus hepatitis (Gillespie, Robinson & Baker, 1952 and Larin, 1953), leptospirosis and possibly viruses, the significance of which is still obscure, *i.e.*, lymphocytic choriomeningitis.

The following outbreak is described, as we feel it shows several interesting features, notably, the varying clinical picture associated with predominant lesions, the virus isolated, and its behaviour in the ferret, and the immunity produced by an egg-adapted virus.

The outbreak occurred amongst R.A.V.C. war dogs at the training school at Melton Mowbray, during the period August to November, 1954.

Brief details regarding inoculation and the salient clinical features of each affected animal are shown in Table I. Later in the paper fuller information is given of the more interesting cases, including temperature charts, although similar data was collected from every case.

Epidemiology

As a background to the epidemic, the general husbandry was rather important. The kennels were run on a " flying herd " basis; eight to 10 dogs entered weekly, collected from various parts of the country, and ranging in age from nine months to two years.

On arrival each dog was placed in a reception block and immediately received 10 ml. of antidistemper serum. For a period of time, averaging 14 days, each dog remained in reception until its suitability for training had been decided. If accepted, the dogs received an injection of egg-adapted virus and entered the main compound.

Approximately 120 dogs were being trained at any one time; they were kennelled in a large compound in ranges of approximately 30.

In spite of the prophylactic measures employed, infection was, in fact, introduced into the compound. Spread was relatively easy, by direct contact during exercise, by the inevitable movement of the R.A.V.C. personnel from dog to dog, and by interchange of feeding bowls, etc. The fact that affected dogs were removed to a hospital half a mile away as soon as the signs of illness were noticed, seemed to do little to stem the spread of infection. See Fig. 1.

During the period under review, 33 dogs, or approximately 25 per cent. of animals passing through the kennels, were affected.

Onset of Disease

In most cases the initial sign of illness was anorexia, complete for several days and associated with pyrexia, although it must be recorded that the temperatures of many apparently normal dogs were as high as 102 to 102.8. It will be appreciated that these dogs were all large and somewhat aggressive, and many, therefore, got excited or impatient when

having their temperatures recorded, which may account for the high readings.

In the early stages of the outbreak, as soon as anorexia was noticed, the dogs' temperatures were taken and in the majority of cases were found to be 103.5 to 104.4 or even higher. As the outbreak continued the earliest sign was commonly the cough, which could often be heard coming from a line of kennels. On identifying the dog responsible and recording its temperature, this was usually found to be in the region of 104, and the dog was at once isolated.

Several days after illness was detected 75 per cent. of the cases showed a copious nasal discharge which was thick and yellow in appearance. This discharge responded well to streptomycin, indicating that bacteria were involved. However, in cases in which pneumonia persisted, the discharge quickly returned when the drug was discontinued. The nasal and ocular discharges found in distemper cases were until recently attributed by many to the virus; however, they appear to be essentially bacterial in origin.

Fever

Fever occurred in all cases except one and was a prominent sign of the disease. A study of the temperature chart of each dog showed that the fever followed a fairly consistent pattern. The temperature once elevated, remained high, sometimes for prolonged periods, and usually fluctuating between 102.8 and 105. The degree of pyrexia was not found to conform to any particular lesion, but of course the duration of the febrile stage was dependent upon the lesion involved; being prolonged in cases of pneumonia. Characteristic temperature charts concerning dogs whose histories are described later are shown in Fig. 3.

Pneumonia

This lesion was diagnosed clinically in 35 per cent. of cases, but as a mild lobular pneumonia can be overlooked, especially in dogs difficult to handle, this lesion may have been even more prevalent than was thought. The average duration of illness of dogs with pneumonia was 35 days, as compared to 14 days' average in other cases. Of the nine dogs which died or were destroyed, six showed pneumonia as a predominant lesion. Pneumonia cases at first showed accelerated respiration, with prolonged inspiration and short expiration. On auscultation the ronchi (dry sounds) were scattered, and on percussion, a general reduction in resonance was noted. A dry, hard cough was usually present at this stage. As the inflammatory process progressed, the ronchi gave place to distinct crepitations, but, generally speaking, these areas became rapidly more localised to the lower part of the diaphragmatic and cardiac lobes, as did the areas of reduced resonance. In fact, these latter areas could be, in most cases, delineated quite easily. As the lungs became consolidated, the crepitations could only be detected in some cases in the early stage, and again in the latter stage (bubbling sounds). The loss of weight in the pneumonia cases was con-

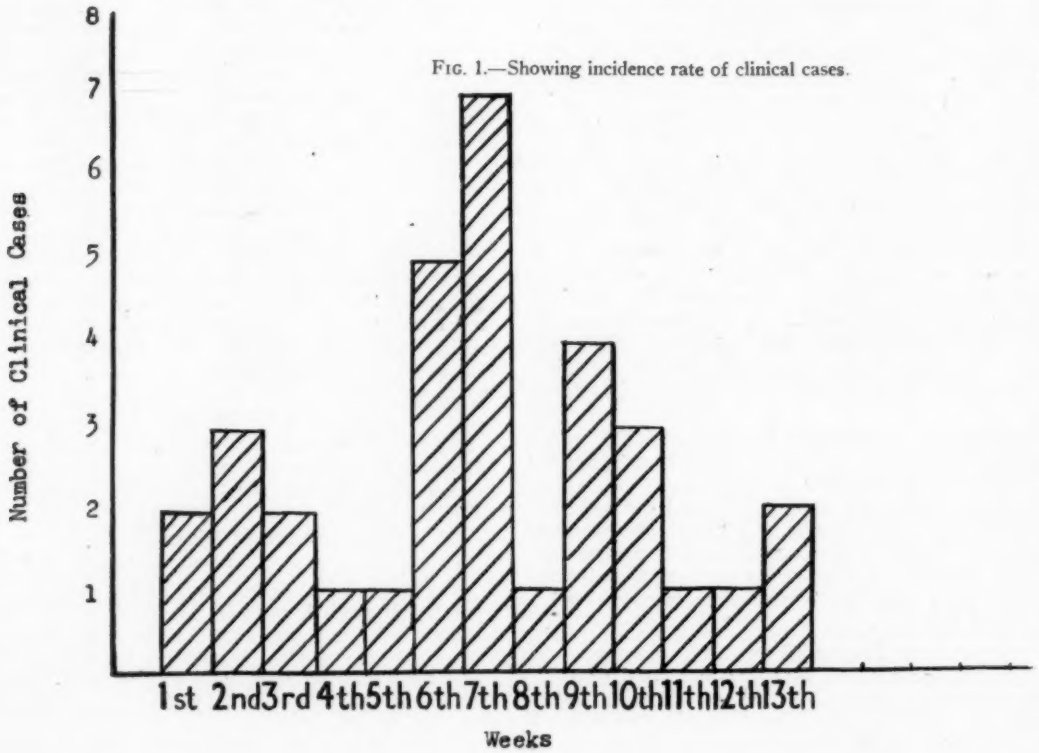

FIG. 1.—Showing incidence rate of clinical cases.

siderable. Briefly, the salient feature found in the lungs *post mortem* was a lobular pneumonia, with areas of consolidation and oedema, and in one case a lobular pneumonia of the diaphragmatic and cardiac lobes with a delicate fibrinous pleural exudate.

Gastro-intestinal Complications

So far as can be ascertained, no vomiting occurred in any case. Thirty-five per cent. had diarrhoea, particularly in the early stage of the illness; but only seven cases (17 per cent.) showed a severe and persistent diarrhoea. This is in striking contrast to outbreaks of distemper in which clinically apparent nervous complications are a predominant feature, and where such nervous manifestations are frequently preceded by violent and prolonged enteritis. In this outbreak, only two dogs with severe bowel involvement actually developed neurological complications. In cases showing diarrhoea, all the Boxers, and only the Boxers, passed blood-stained stools. The passage of blood-stained faeces usually persisted for five or six days and then cleared up, whether treatment was attempted or not.

Involvement of the Central Nervous System

The clinical evidence of this condition was small. The point " clinical " evidence is stressed because encephalitis was detected *post mortem* in certain dogs which showed no signs of nervous involvement during life. For instance, Fig. 2 (Fig. B) shows that virus was present in the brain tissue of Tex. In addition histological examination of the cerebellum showed perivascular cuffing and areas of demyelinisation, yet clinically the dog had shown no definite evidence of encephalitis or involvement of other parts of the central nervous system. Therefore, it is important to stress in this outbreak, that encephalitis and encephalomyelitis may have been prevalent, but nervous manifestations were few. Two dogs developed epileptic convulsions and were destroyed and five others showed varying degrees of inco-ordination of the hind limbs. Of these five, Blackie was destroyed because of paraplegia and histological examination of the spinal cord showed prominent perivascular cuffing and areas of demyelinisation. Two, although showing this condition, died with pronounced pneumonia lesions, which were considered to be the cause of death, and the other two recovered. Therefore, of the nine deaths which occurred, only two could, with certainty, be attributed to neurological factors; these two were, of course, destroyed, and did not die naturally.

According to Ribelin (1953) the classical description of distemper encephalitis is that the animal recovers from an attack of the catarrhal form of the disease, only to suffer a relapse with the nervous form several weeks later. This also fits the description of " Hard pad " by McIntyre, *et al.* (1948).

In this outbreak, the nervous complications developed early in the course of the illness, before the catarrh had subsided, and in three cases accompanied pneumonia. Thus, the virus appeared capable of causing severe lesions in two distinctly different tissues at the same time.

Virology

It was essential to establish that a virus was involved in this outbreak.

Cerebrospinal fluid was collected from a dog sent down to the Canine Research Station for observation, which had pneumonia and which later developed paraplegia. The fluid was injected into ferrets, which showed prolonged febrile reactions and death in 50 days, as shown in Fig. 2 (Fig. A). The virus can be classified as a " C " type virus (Larin, 1954). Figs. B and B_1 (Fig. 2) show similar reactions; material in this instance was prepared from the spleen (F.157) and from the brain tissue (F.158) of a dog which at *post mortem* showed oedema of the lungs and pneumonia, and although showing no clinical evidence of encephalitis during life, histological changes found in the brain were marked, and a similar virus was demonstrated from both tissues. Later in the outbreak, a blood sample was collected from a dog undergoing observation at the Canine Research Station. At the time of collection, the animal's temperature was 103.6°, and it had a lobular pneumonia. The ferret inoculated died in 25 days as shown in Fig. 2 (Fig. C). Although death occurred earlier than the above, it was nevertheless a similar reaction.

Prophylactic Measures

As previously stated, a canine distemper vaccine in the form of an egg-adapted distemper virus was used extensively in the kennels. It is generally considered that by this method protection against distemper is obtained in 24 hours, and that immunity is produced in eight days. Seventy-five per cent. of the diseased dogs had received egg-adapted virus, on an average 12 days after entry into the kennels. The average time between administration of the vaccine and the onset of the clinical signs of distemper was 13 days, although this period varied from one to 43 days. Even so the average figure was five days beyond the period when immunity was expected to have been conferred.

It seems unlikely that the hyperimmunised serum given to the dogs at varying periods prior to inoculation could have had any influence upon the development of immunity by the egg-adapted virus; this point was confirmed by the manufacturers who supplied both products.

Treatment

As far as the treatment was concerned, the following points stood out:—

(1) The disease tended to take its course whatever therapy was employed, whether it be antibiotics, sulpha drugs, antidistemper serum or just plain aspirins.

(2) The naso-ocular discharge did not respond to penicillin therapy but did clear when streptomycin was employed.

(3) Nursing, warmth and tempting food, wherever possible, did more to aid recovery than anything else. At the time of writing this discussion, some six months after the outbreak ceased, it is interesting to note that all the dogs which recovered appear to be completely cured.

TABLE I

DETAILS OF DOGS AFFECTED BETWEEN AUGUST 2ND AND NOVEMBER

Number, name, age, breed	Days from entry to vaccination	Days between vaccination and illness	Duration of illness Days	Nasal and ocular discharges*	Pulmonary involvement
4B37. Jigg Boxer 1 year 7 months	17	1	14	At first mucoid quickly becoming yellow and thick, havi g purulent appearance	Cough persistent, no pneumonia detectable
4B47. Tarl Alsatian 2½ years	10	7	14	Ditto	None
4B49. Nero Alsatian 1¾ years	11	10	49	Ditto	Dyspnoea. Persistent cough. Diffuse dullness on percussion indicating lobular pneumonia followed by consolidation of right apical l be
4A99. Riff Alsatian 2 years	15	40	26	Ditto	Increased respiration. Persistent cough, scattered areas of reduced resonance indicating lobular pneumonia
4B61. Alsatian 2 years	4	5	13 destroyed	Ditto	None
4B54. Ace Alsatian 2 years	23	7	34	Ditto	Increased respiration with areas of reduced resonance indicating bilateral lobular pneumonia
4B74. Brunch Alsatian 3 years	2	8	53 destroyed	Ditto, extremely profuse	Typical early signs of bilateral lobular pneumonia resulting in consolidation of a large area of the left lung and some consolidation and oedema of right lung
4B82. Doberman Casban 1½ years	Egg-adapted virus given during illness 4		10	Ditto	None
4B85. Rally Alsatian 1½ years	11	2	23	Ditto	Increased respiration, cough, dullness on percussion indicating a diffuse lobular pneumonia
K132. Major Alsatian 1½ years	No egg-adapted virus given .....17.....		20	Ditto	None
K139 Alsatian 1½ years	No egg-adapted virus given .....16.....		2 destroyed	Ditto	None
4B75. Bolo Boxer 1 year 10 months	2	18	8	None	None
4B77. Basher Boxer 1 year	20	5	9	Profuse yellow and thick, having a purulent appearance	None
4B67. Bronx Alsatian 1 year	17	29	16	Ditto	Increased respiration, cough, slight dullness on percussion indicating mild lobular pneumonia
4B72. Lynx Alsatian 1½ years	5	20	16	Ditto	None
4B71. Devil Alsatian 1½ years	17	9	46	Ditto	Persistent cough, typical signs of lobular pneumonia of right lung

* A brief description of the nature of the discharge has been preferred in many cases to the use of the definite term "purulent" as it was not established in each case showing a thick yellow discharge, that it was in fact purulent, *i.e.*, containing numerous polymorphonuclear leucocytes showing regressive changes.

2ND, 1954, ROYAL ARMY VETERINARY CORPS, MELTON MOWBRAY

Intestinal involvement	Clinical involvement of central nervous system	Other signs of illness	Remarks
None	None	Anorexia complete for four days, low food intake for further six days	
Diarrhoea for first seven days	None	Partial anorexia for three days	
Intermittent diarrhoea	None	Anorexia for three days	Pyrexia was present for a period of 33 days.
Diarrhoea for first 10 days	None	Anorexia for five days during early part of illness	
None	Epileptic convulsions from 8th to 13th day of illness	None	
Diarrhoea for first four to five days	None	Anorexia for three days early in the illness	Reduced appetite for approximately two weeks
Severe intermittent diarrhoea	Head held to left side, incoordination of fore and hind limbs	Intermittent anorexia throughout. Advanced retinal atrophy developed	*Post-mortem* findings confirmed the pulmonary lesions. Histological examination showed perivascular cuffings and areas of demyelinisation of brain tissue, particularly cerebellum
None	None	Anorexia complete for four days	
None	None clinically apparent, but marked depression may have been indicative	Anorexia for five days. Inappetence for a further five days	Marked depression was an outstanding feature in this case
None	None	Anorexia for three to four days	
Diarrhoea	Inco-ordination and slight chorea of hind limbs	Anorexia	This animal presumably ran a subclinical course of the disease for some time prior to the onset of C.N.S. involvement
Blood-stained stools	None	None apart from pyrexia, initially	
Blood-stained stools	None	None apart from pyrexia, initially	
Diarrhoea for 14 days	None	Anorexia complete for six days, inappetence for further eight days	
None	None	Inappetence only	
None	Inco-ordination of hind limbs, high stepping action and inability to focus	Marked cardiac arythmia developed	Animal remained excitable and developed into a " spinner "

(This Table is continued overleaf)

TABLE I

Number, name, age, breed	Days from entry to vaccination	Days between vaccination and illness	Duration of illness. Days	Nasal and ocular discharges*	Pulmonary involvement
4B58. Blackie Alsatian 1 year 8 months	19	21	67 destroyed	Ditto, lasting throughout the illness	Persistent cough with typical signs of diffuse bilateral lobular pneumonia
4B79. Mark Alsatian 1½ years	9	–1	18	Ditto	Ditto
4B73. Joe Boxer 2 years	9	12	22	Ditto	None
4B87. Vex Alsatian 1 year 2 months	4	17	6 died	None	None
4B86. Beauty Alsatian 1 year 1 month	No egg-adapted virus given 11		13	Slight mucoid discharge	None
4B76. John Alsatian 1 year 1 month	14	8	13	None	None
4B97. Baron Alsatian 1 year 10 months	No egg-adapted virus given 13		23	None	None
0A05. Tex Alsatian 6 years	No egg-adapted virus given 3		..... 5 died	None	Dyspnoea, areas of oedema and consolidation involving both lungs
4B92. Nelson Alsatian 1 year 8 months	No egg-adapted virus given 26		38	Moderate amount of yellow discharge having purulent appearance	Some diffuse areas of lobular pneumonia
AC04. Rev Alsatian 1 year 10 months	10	10	12 destroyed	Ditto, very profuse	Extensive bilateral pneumonia with areas of consolidation
4B88. Texan Alsatian 1 year 8 months	3	19	22 died	Ditto	Cough, dullness on percussion. Increased respiration, indicating lobular pneumonia
4B83. Mex Alsatian 3 years	5	25	6	None	None
4B68. Bustle Alsatian 1 year 8 months	9	17	6	Slightly mucoid	None
4B93. Moski Alsatian 2½ years	No egg-adapted virus given 24		.....26 died	Profuse yellow and thick having purulent appearance	Bilateral pneumonia with areas of consolidation
4B25. Chief Boxer 2¼ years	64	28	17	Ditto	None
4B98. Paddy Alsatian 1 year 8 months	16	13	17	Profuse, yellow and thick, having purulent appearance	None
4B90. Karl Alsatian 2 years	1	12	21	Ditto	None

—contd.

Intestinal involvement	Clinical involvement of central nervous system	Other signs of illness	Remarks
None	Hypersensitivity, inco-ordination, later paraplegia. See history	Periods of anorexia. Myocarditis	For *post-mortem* findings and histological examination see detailed history
Intermittent diarrhoea	None	Intermittent anorexia	
Blood-stained faeces persisted from second to 12th day	None	Anorexia for 45 days	
None	None	Anorexia	Acute pyrexia, a temperature of 106·7° was followed by collapse and death within a few hours
None	None	Anorexia for first three to four days	
None	None	Anorexia initially. Pyrexia for nine days	The loss of weight in this case was considerable, particularly in view of the absence of definite lesions
None	Scleral congestion was the only sign suggestive of C.N.S. involvement	Marked loss of weight	This was the only case in which no fever occurred
None	Some inco-ordination of hind limbs	Anaemic. Pulse weak and irregular. Uraemic	For *post-mortem* and histological examinations see detailed history of case
None	Slight inco-ordination of hind limbs	Inappetence and short periods of anorexia throughout. Loss of condition slight	
Severe and prolonged diarrhoea	None	Rapid and marked loss of condition	
Diarrhoea during early part of illness	None	Anorexia during early part of illness	*Post-mortem* confirmed the lung changes
Ditto	None	Anorexia for first three days	Pyrexia lasted for only four days
None	None	Anorexia for three days	Ditto
Severe diarrhoea, especially at first	High stepping action, later paraplegia	Anorexia complete for 10 days. Inappetence for further 10 days	*Post-mortem* confirmed the lung changes
Diarrhoea during early part of illness	None	Anorexia for first three days	
Slight diarrhoea throughout illness	None	Anorexia for first seven days	
None	None	Anorexia, marked loss of condition	

Note.

When studying this table it should be appreciated that it has not been possible to present the temperature chart of each case. However, all but one dog ran a high recurrent fever.

Mark, who weighed 68 lb. at the peak of his illness, is now a beautiful looking Alsatian weighing nearly 100 lb.

Ace and Nelson, who both had a slight paralysis, are completely recovered and are now fully trained as guard dogs.

Nero and many others also rapidly put on weight again and have now been posted overseas.

Typical Case Histories

CASE NO. 3

Nero—Alsatian (male—one and three-quarter years)

Given egg-adapted virus on July 20th, 1954. Admitted to hospital on August 2nd, 1954, showing typical early signs of distemper with pyrexia and anorexia, catarrhal ocular and nasal discharges. By the fifth day there was evidence of lobular pneumonia of the right apical lobe. Some days later the left lung became similarly affected and other lobes became involved, although actual consolidation of clinically definable areas was not obvious. The pneumonia did not respond to treatment with penicillin or sulphamezathine, and for a period of 33 days, the temperature remained elevated. It was only after entry to the Canine Research Station, when it was possible to give large doses of immune gamma globulin, that the temperature broke and recovery commenced. The animal lost a tremendous amount of condition and during the last three weeks of illness a harsh, dry, persistent cough was present. No nervous complications developed.

CASE NO. 17

Blackie—Alsatian (male—one and three-quarter years)

Admitted to hospital 21 days after receiving egg-adapted virus. Predominant symptoms being pyrexia, anorexia, nasal and ocular discharge (mainly mucoid in character) and extreme lethargy. The symptoms lasted for seven days, after which he began to improve slightly. He entered the Canine Research Station for observation on the ninth day of illness and appeared reasonably alert, although he resented handling about the head and showed a general irritability.

There was a marked conjunctivitis and a slight discharge from each eye. The nasal discharge was not so yellow or profuse as in other cases. A harsh, dry cough was present along with early signs of a lobular pneumonia. Bowels were normal and there was no tonsillitis.

In a few days the nasal discharge was yellow and profuse and the lobular pneumonia was more extensive. By the 21st day of illness the pneumonia had cleared considerably, the nasal discharge had almost ceased, but the pyrexia remained severe. On the 23rd day, a slight inco-ordination of the hind limbs was noticed, this progressed rapidly until paraplegia was almost complete, although pedal and patella reflexes remained. Incontinence was present for only a few days. From the 28th day of illness a gradual improvement commenced until the animal was discharged on the 46th day, showing only a slight inco-ordination of the right hind leg. Body condition had returned and the dog lost the irritability which had been so noticeable during the illness. However, three weeks later paraplegia returned suddenly and although reflexes remained good the dog was destroyed.

Post-mortem Findings

Macroscopical: Mediastinal and bronchial lymph glands swollen.

Lungs: Oedema and emphysema in both.

Kidney: Congested.

Liver: Very congested.

Spleen: Congestion and haemorrhagic infarcts.

Histological Findings

Lungs: Oedema and emphysema.

Liver: Dilatation of sinusoids which were packed with erythrocytes.

Kidney, Heart and Adrenal Gland: No changes.

Pancreas: Regressive changes of the nuclei in the parenchyma and islets.

Urinary Bladder: Oedematous.

Cerebrum and Cerebellum: Slight perivascular cuffing and small areas of demyelinisation.

Spinal cord: Very prominent perivascular cuffings in lateral, ventral and dorsal columns as well as areas of demyelinisation.

On the ninth day of illness a sample of cerebrospinal fluid was collected from this dog and inoculated into a ferret which died on the 48th day, the febrile reaction and clinical signs being typical of a "C" type virus Fig. 2 (Fig. A). This sample of cerebrospinal fluid showed a cell count of 28 per c.mm., the normal figure being three per c.mm.

CASE NO. 33

Karl—Alsatian (male—age ?)

Given egg-adapted virus on September 10th, 1954, admitted to hospital on October 22nd, 1954, with pyrexia and a copious muco-purulent nasal and ocular discharge. Anorexia persisted for four days. At no time during the illness was there any clinical evidence of encephalitis or pneumonia. Temperature fluctuations had ceased by the 14th day, after which the dog progressed rapidly to complete recovery.

From the temperature chart it will be seen that the degree of pyrexia remained slight and the duration short.

CASE NO. 27

Tex—Alsatian (male—six years)

This case is interesting because of the short duration of clinically apparent illness and the fact that the signs, when examined at the Canine Research Station, on the day of death, were indicative of an advanced case of chronic interstitial nephritis. However, brain tissue was collected shortly after death and used in the form of a suspension for ferret inoculation, see Fig. 2 (Fig. B_1), and a "C" type distemper virus was isolated.

Initially the animal showed complete anorexia, a subnormal temperature and progressive weakness. A few hours before death the dog was uraemic, the tongue was yellowish brown and the buccal mucosa ulcerated; dehydration was marked, the pulse weak and irregular and the breathing rapid and laboured.

Post-mortem Findings

Lungs showed scattered areas of oedema; the liver, haemorrhages around the central veins. Kidney showed interstitial nephritis with marked fibrosis causing a considerable distortion of the kidney tissue. Histological examination of the brain showed slight perivascular cuffing with areas of demyelinisation in the cerebellum. Agglutination tests carried out on blood collected immediately after death were negative for *L. icterohaemorrhagiae* and *L. canicola*.

From the point of view of distemper, this case had clinically shown no evidence of neurological manifestations, yet perivascular cuffing was noted in the cerebellum and a " C " type virus isolated from the cerebrospinal fluid, so that there is little doubt that the virus of distemper was active and it would seem that it was superimposed upon residual nephritic damage.

CASE NO. 25

Nelson—Alsatian (male—age ?)

No egg-adapted virus given. This case is of interest because the dog showed a remittent fever for 41 days. As can be noted from the temperature chart (Fig. 3, No. 25) the temperature was sometimes high for long periods. Towards the end of the illness an inco-ordination of the hind limbs occurred, suggesting that the elevated temperature had, in fact, been due to involvement of the central nervous system. The inco-ordination was slight and completely cleared 16 days after onset.

Initial signs of illness were a slight ocular and nasal discharge and incomplete anorexia. The lungs were never involved and apart from the foregoing comments regarding the central nervous system, no other organs were clinically involved.

CASE NO. 30

Moski—Alsatian (male—age ?)

This dog was acutely ill when admitted to hospital, showing pyrexia, profuse nasal and ocular discharge, diarrhoea and extreme wasting. Anorexia was complete for the first 10 days of illness, during which time he received glucose saline subcutaneously. After the 10th day he regained his appetite gradually, but remained extremely weak. Death occurred 26 days after illness.

Clinically this animal showed no evidence of involvement of the central nervous system. A bilateral lobular pneumonia with, later, extensive areas of consolidation, was present throughout the illness.

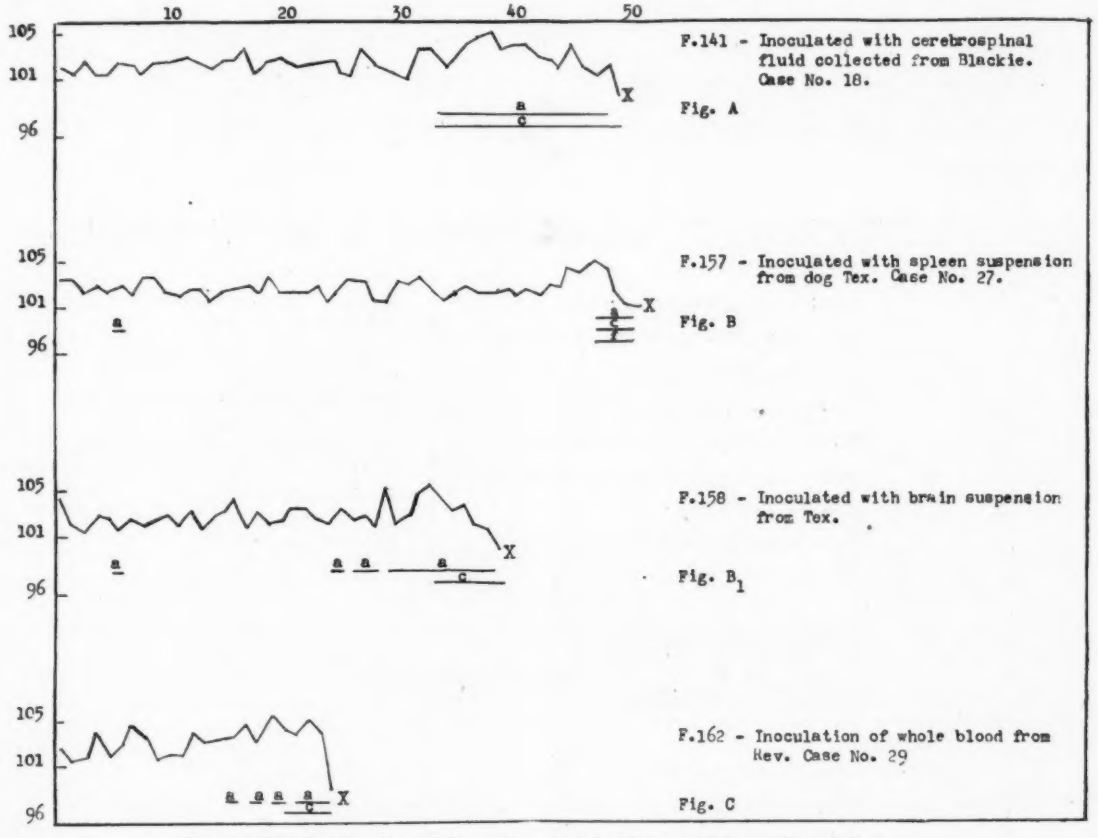

FIG. 2.—Showing reactions of ferrets inoculated with material from affected dogs
KEY: a—anorexia; c—conjunctivitis; f—fits; X—death.

Post-mortem Findings

The carcase was emaciated. The left lung showed an extensive lobar pneumonia of the diaphragmatic and cardiac lobes. The right lung a lobular pneumonia, with areas of consolidation. The pleural surface of both lungs was covered by a delicate layer of fibrin. Microscopically, lung tissue showed extensive breakdown of the alveolar walls, with an increased amount of connective tissue, giving the appearance of solid tissue. Some of the alveoli and bronchi were filled with inflammatory exudate. Histological examination of the liver showed numerous necrotic foci (centrilobular necrosis) indicative of residual damage following canine virus hepatitis infection. These findings suggest that distemper infection was superimposed upon residual damage caused by canine virus hepatitis.

Discussion

From the foregoing account of this outbreak, it will be seen that the virus concerned was capable of producing viraemia and lesions in a variety of tissues. A high percentage of the dogs showed involvement of the upper respiratory tract and bacterial complications arose quickly in the course of the disease, producing a profuse nasal discharge. Streptomycin produced an effective and rapid response and the discharge did not recur when the drug was discontinued, unless pneumonia was present. It can be concluded that, although the virus no doubt produced initial tissue damage, the discharge itself was essentially bacterial in origin.

The fact that the lesions in the upper respiratory tract responded to an antibiotic whilst the pneumonia lesions did not, indicates that the latter lesions were

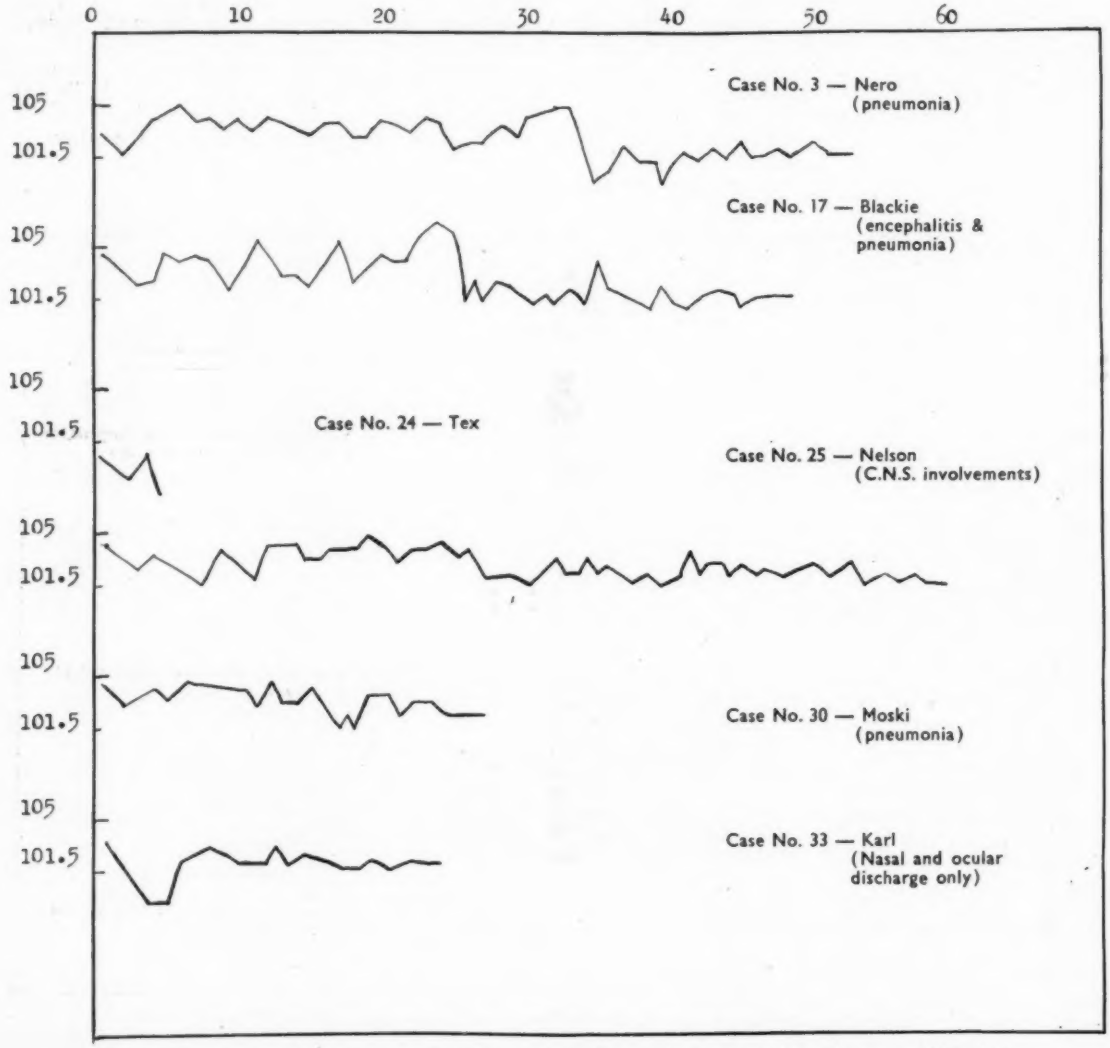

FIG. 3.—Temperature charts of six affected dogs indicating predominant lesions (see case histories)

predominantly viral in origin. In fact, in the cases which succumbed and where bacteriological examination of lung tissue was made, no bacteria of any significance were isolated.

Areas of oedema were detectable in some cases clinically and also *post mortem*. It is probable that this pulmonary oedema, in many distemper cases, is neurogenic in origin, but further work is required to substantiate this point.

Evidence is given of the presence of the virus in brain tissue and cerebrospinal fluid, and also pathological indications of encephalitis; showing that the virus involved was neurotropic as well as viscerotropic.

We should like to stress the point that dogs suffering from distemper may show no evidence of involvement of the central nervous system, in spite of the fact that the virus is active in brain tissue. Consequently the neurological manifestations observable clinically, may frequently be the end-result of damage to nervous tissue.

In this outbreak all the ferrets inoculated with infected material showed a reaction typical of a " C " group virus. It will be seen that the death of the ferret followed a prolonged course of illness, indicating that it is not a highly susceptible host for the propagation of " C " group virus; yet in the dog it can show both neurotropic and viscerotropic characteristics.

The behaviour of the " C " type virus in the ferret is strikingly different from the " A " type, which produces a constant and clearly definable reaction and which closely resembles the behaviour of the distemper virus as described by Laidlaw and Dunkin.

One of the features of the distemper virus which is becoming increasingly obvious is its changeability. This is well demonstrated by the " B " group virus (Larin, 1955) which, on passage in the ferret, appears capable of increasing its virulence until it resembles " A " type virus or decreases in virulence to the " C " type.

Evidence of the changeability of the virus in the dog is well demonstrated by the description by Mansi (1952) of the Glasgow S.123 strain, which in initial isolation showed strong neurotropic characteristics, although these disappeared on passage.

It seems that the virus of distemper is not a homogenous entity but is a complex one, the individual characteristics being governed by genetical determinants.

With this in mind it is difficult to visualise how any vaccine can confer immunity against all variants of the virus, and it seems probable that in this outbreak the egg-adapted virus in a relatively high proportion of dogs failed to impart immunity against this particular " C " type virus. Alternatively the level of immunity produced may have been inadequate.

It should be pointed out that over the period of several months, during which egg-adapted virus was being used, it was received in small lots of four to five doses involving four separate batches.

Summary

An outbreak of distemper amongst adult army war dogs is described.

An analysis of outstanding lesions is given and the result of prophylactic measures considered.

The effect upon ferrets of the isolated virus is discribed and the changeability of the distemper virus discussed.

Acknowledgments.—We are greatly indebted to Mr. S. F. J. Hodgman, Director of the Canine Research Station and Col. J. Clabby, R.A.V.C., for their co-operation and guidance. Also to Dr. N. M. Larin, Senior Scientist and Virologist at the Canine Research Station for his helpful advice and virological data; to Mr. G. Skulski, Pathologist, and Dr. M. E. Davies, Bacteriologist, both of the Canine Research Station, for their assistance. The outbreak was dealt with under the orders of the Commandant, R.A.V.C. Training Centre and Depot, who has granted permission for the publication of the paper.

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HOSPITALITY REQUIRED

A second year French veterinary student in Toulouse would like to stay with a British veterinary family as a paying guest for about three weeks between July 10th and September 1st. His first interest is in horses, and then in cattle. He has seen some practice in France.

A 26-year-old Swiss veterinary student in his seventh semester at Zürich University would like to stay in England some time between the end of February and the beginning of April.

He hopes to see an animal hospital or a small animal practice in London, and speaks fairly good English.

The 21-year-old daughter of a French veterinary surgeon would very much like to spend the Easter holidays *au pair* or as a paying guest with a veterinary family in the London area or near to it.

Would any member interested in any of these suggestions kindly get in touch with the General Secretary, B.V.A., 7, Mansfield Street, Portland Place, London, W.1.

Endotracheal Intubation in Cattle

BY

A. MESSERVY and E. WYNN JONES*

Department of Veterinary Surgery, University of Bristol

THE induction of general anaesthesia in ruminants, especially cattle, is a major and often dangerous operation owing to the possible inhalation of regurgitated rumen contents or accumulated saliva, The aspiration of such fluid into the trachea and consequently into the lungs may result in immediate asphyxia or atelectasis followed by pneumonia. It has been amply demonstrated that inhalation of saliva and regurgitated rumen contents can occur at any stage of anaesthesia, although more likely during deep anaesthesia when sphincters are relaxed and regurgitation can occur more easily. In addition, when the stage of surgical anaesthesia is attained, the swallow and cough reflexes are abolished and their protection is consequently lost. Predisposition to regurgitation also occurs if the stomachs are full, especially if their contents are fluid; it may also occur when the animal falls to the ground during induction.

Indications for Endotracheal Intubation

1. To ensure a free airway during general anaesthesia and to prevent the inhalation of food and saliva.

2. For ventilation of lungs by means of positive pressure apparatus in case of anaesthetic emergencies or when the use of a relaxant is indicated (*viz.*, in the reduction of fractures).

Instruments Required

A. Thick walled rubber tubing, to use as guide tube. (The stomach tube used for horses is satisfactory.)

B. Magill endotracheal tube with inflatable cuff, a rubber bulb or 50 c.c. syringe to inflate cuff and artery forceps to seal the inflated pilot tube. The Magill tube, internal diameter 1 inch and $\frac{7}{8}$ inch, length 36 inches for adult cattle, 3/5 inch internal diameter, length 16 inches for calves has been found satisfactory; it is essential that it should be made of thick walled rubber to overcome the dangerous accident which might arise if it became kinked.

C. Drinkwater mouth gag.

Technique in Cattle

It is the practice in this hospital to induce general anaesthesia in cattle by the intravenous administration of 10 per cent. solution of chloral hydrate. Nembutal or pentothal sodium may also be used to supplement this, to facilitate induction or to improve relaxation.

To permit endotracheal intubation, the jaw, cough and deglutition reflexes must be depressed, but it has been found that complete relaxation of jaw and abolition of laryngeal reflex are not essential. Once the stage of deep narcosis or light anaesthesia has been achieved a Drinkwater gag is inserted into the mouth. As direct vision intubation is not possible, the endotracheal tube is inserted manually; the large diameter of the tube makes it difficult to pass the hand holding this tube into the pharynx. It is, therefore, usually necessary to pass a tube into the trachea first, using this as a guide for the endotracheal tube.

The guide tube is introduced into the mouth held between the middle and index fingers, the epiglottis easily palpated is depressed with the index finger and the end of the tube introduced into the lumen of the larynx; it is then pushed a distance of from 12 to 18 inches along the trachea, so that it will not easily slip out when the hand is withdrawn from the pharynx. The Magill tube, liberally smeared with an ointment containing a local anaesthetic is now threaded over the guide tube and gently but firmly pushed along until it enters the larynx.

Passage of the tube through the mouth is facilitated by traction on the tongue, thereby overcoming obstruction caused by the dorsum of the tongue; when the endotracheal tube reaches the larynx some resistance is usually appreciated. Occasionally this resistance will prevent entry of the tube into the larynx, and this obstruction can be overcome by rotation of the Magill tube, or it may be found necessary to replace it by a smaller sized tube. When the endotracheal tube has been inserted, the guide tube is withdrawn and the cuff inflated through its pilot tube; the degree of distension of the pilot bulb indicates the degree of inflation of the cuff which should be sufficient to seal the lumen of the trachea about the tube. If this is so, resistance to sliding the tube up and down the trachea is detected.

In smaller ruminants in which it is not possible to pass the hand into the pharynx, the endotracheal tube is passed by direct vision with the aid of a human laryngoscope with a large modified blade.

During the course of an operation, particularly if prolonged, the tube may become partially blocked by mucus, indicated by gurgling sounds; this mucus should be aspirated immediately. During the recovery phase the endotracheal tube is left in position until it is obvious that the swallow reflex has returned, and providing the gag is kept in position, the Magill tube will not be damaged.

Conclusion

As the cost of apparatus required is relatively low and the technique simple, it is considered that where general anaesthesia is indicated in ruminants it is essential to use an endotracheal tube primarily to prevent aspiration of food material, and secondly to ensure a free airway.

Acknowledgment.—This technique evolved largely while investigating general anaesthesia, which project was assisted financially by the Totalisator Fund to whom we are indebted. Our thanks are due to Dr. J. Clutton Brock for suggesting the use of and making the modified laryngoscope blade.

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MESSERVY, A., & WYNN JONES, E.—ENDOTRACHEAL INTUBATION IN CATTLE

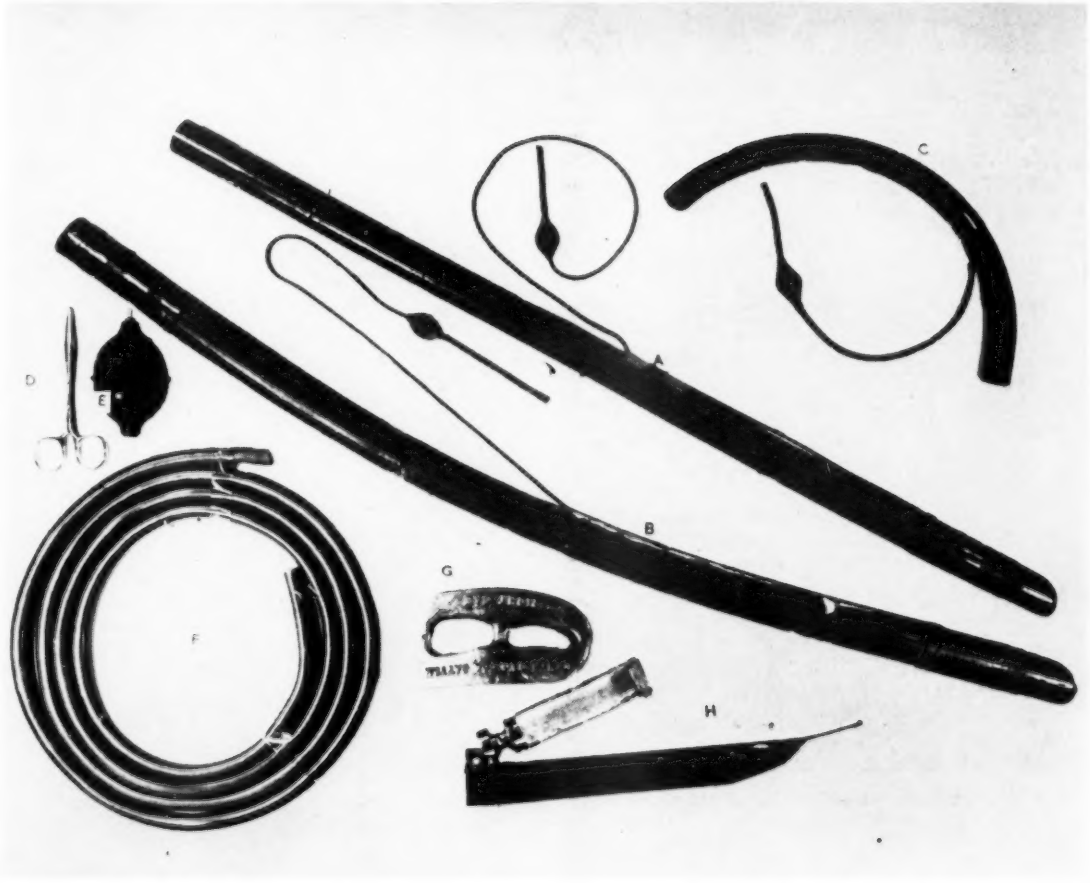

FIG. 1.—Instruments used:—

(*a*) *and* (*b*) Magill endotracheal tubes with inflatable cuffs for adult cattle.

(*c*) Magill endotracheal tube V 14 suitable for calves.

(*d*) Artery forceps.

(*e*) Bulb for inflating cuff.

(*f*) Thick walled rubber tubing.

(*g*) Drinkwater mouth gag.

(*h*) Laryngoscope with modified blade for use in smaller ruminants.

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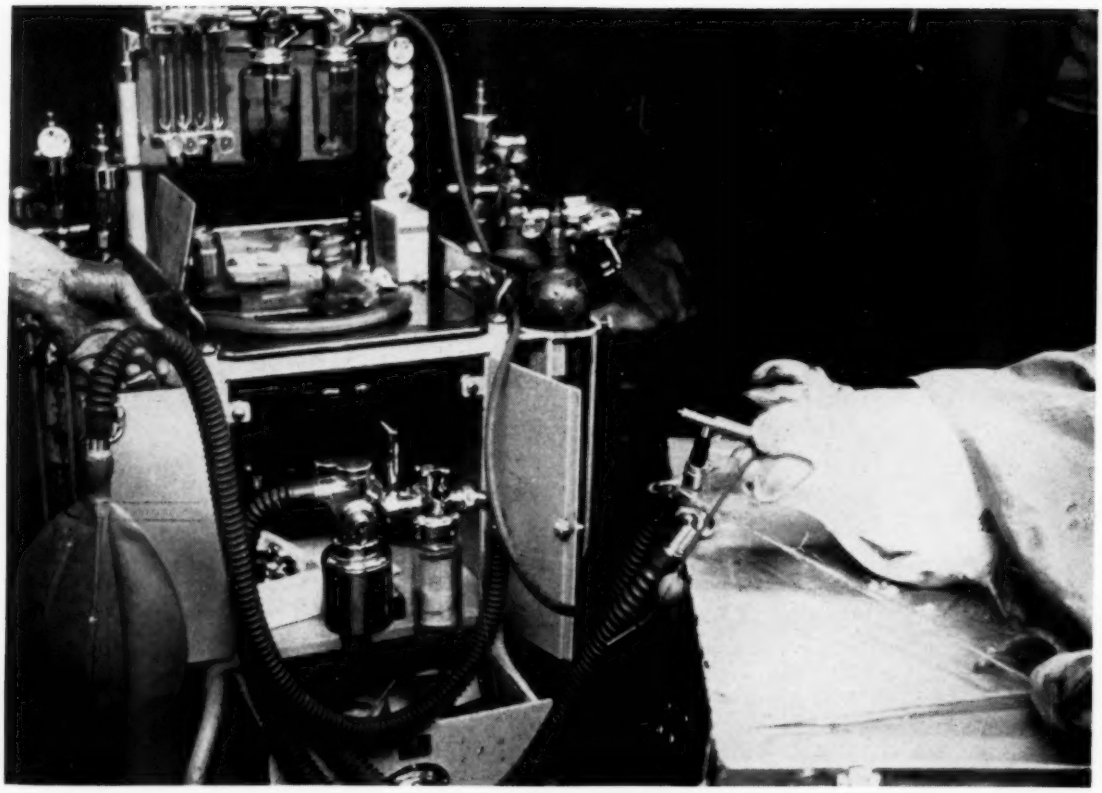

FIG. 2.—Administration of ether by closed circuit method to Hereford calf, aged 14 days. Endotracheal tube No. V 14.

The Use of Germicidal Dips in the Control of Bacterial Contamination of the Shells of Hatching Eggs

BY

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INFECTION with organisms of the *Salmonella* group other than *S. pullorum* and *S. gallinarum* appears to be increasing in incidence, particularly in turkey poults (Gordon, 1954). Control of these diseases by methods other than improved hygiene have proved far from satisfactory and most workers are agreed that agglutination tests are unlikely to become a practical method for the routine detection of carriers (Wilson, 1948). Williams Smith (1951) has reported favourably on the use of furazolidone in outbreaks of *S. typhi-murium* but has pointed out that a high proportion of treated chicks or poults become carriers. Therapy, therefore, would still appear to be of limited value in the control of outbreaks of Salmonellosis in breeding flocks.

Numerous workers have drawn attention to the importance of the public health aspect of this problem, particularly from the consumption of infected duck eggs, Gordon (1949) and recently Pereira & Blaxland (1955) have reported cases of *S. typhi-murium* infection in man resulting from contact with infected turkey poults.

Hinshaw *et al.* (1944), Buxton & Gordon (1947) and others have shown that the greater proportion of carriers of *Salmonella* organisms, other than *S. pullorum*, yield these organisms from their intestines, and it is suggested that such *Salmonella* infections in chicks and poults mainly arise from faecal contamination of the egg shell (Buxton & Gordon, *loc. cit.*, & Wilson, 1949). It has also been reported by a number of workers (Haines & Moran, 1940, Pomeroy & Fenstermacher, 1941, and Buxton & Gordon, *loc. cit.*) that *Salmonella* organisms can pass through the egg shell, particularly if a warm, newly laid egg is brought into contact with infective material at a lower temperature. It has also been pointed out that the cleaning of eggs in cold water (Haines, 1939, Gillespie & Scott, 1950, and Thompson & Adams, 1953) or wiping with a damp cloth (Wilson, 1945), hastens bacterial penetration and facilitates the transference of infection from egg to egg.

Many hatcheries carry out the practice of fumigating hatching eggs with formaldehyde gas in specially constructed chambers prior to incubation (Lancaster, Gordon & Harry, 1954). In many instances such fumigation would not be carried out until at least seven days after the eggs had been laid. Gillespie & Scott (*loc. cit.*) in studying the rate of penetration of *Pseudomonas* sp. found that soon after cooling, organisms on the shell had already penetrated to sites inaccessible to subsequent disinfection. This was confirmed by Gordon & Tucker (1954) who found that the penetration of *Pseudomonas* sp. from the outside of the shell to the shell membrane increased after 24 hours and that by one week, 10 per cent. of shell membranes and 6.6 per cent. of egg contents were contaminated. There appears to be no precise information on the rate at which *Salmonella* organisms penetrate through the shell after the egg has been laid, although according to Shaff (1936) it took place in duck eggs in the incubator in five days, whereas Lerche (1936) found that at room temperature penetration did not occur until 15 days. Buxton & Gordon (*loc. cit.*) recorded that penetration occurred in incubated eggs within seven days and at room temperature in 14 days; the scale of experiment, however, was too small for definite conclusions to be drawn. As Haines (1936) points out, there are a number of variables involved in the penetration of the egg shell by bacteria, such as the quality, size, number of pores of the shell, age of the egg, the presence of moisture on the shell and damage to or removal of the cuticle. If, however, *Salmonella* organisms, particularly those which are motile, penetrate at the same rate as the *Pseudomonas* sp., their fumigation at the hatchery some days after the eggs have been laid is likely to give variable results depending on the conditions under which the eggs were laid and stored.

The dipping of hatching eggs in germicidal solution on the same day on which they are collected from the nests has been regarded for some years as a fruitful method for the control of avian Salmonellosis and other egg-borne diseases. Pritsker (1941) refers to the dipping of eggs in a 0.5 per cent. formalin solution warmed to 23° C., the eggs having previously cooled to 10° C.; Olsen & McNally (1947) to the use of sodium hydroxide, sodium orthophenylphenate and quaternary ammonium chloride solution at a temperature higher than that of the egg.

Investigations at this laboratory (Lancaster, Gordon & Tucker, 1952) showed that the following disinfectant solutions when used at 25° C. were efficient in the removal of *S. pullorum* from artificially infected, clean and dirty eggs; 0.2 per cent. sodium salt of para-toluesulphanochloride (chloramine T), 1.8 per cent. of 10 per cent. sodium hypochlorite*; the addition of detergent to the preceding increasing their effectiveness: 0.5 per cent. Cetyltrimethyl ammonium bromide†; and 1.5 per cent Chlorometa zylenol‡. The immersion time was maintained at 15 minutes for all the disinfectants tested. There was no detrimental effect on the hatchability of fertile eggs immersed in the various disinfectants at double their effective strength. The stability of the solution for the immersion of successive groups of eggs was also

* Deosan.
† Cetavlon.
‡ Dettol.

examined. *S. thompson* and *S. typhi-murium* were more resistant to the action of the disinfectants tested. These were also found to be valueless in the control of rots during the storage of eggs for human consumption.

Present Investigation

In view of the findings of Lancaster *et al.* (*loc. cit.*) that *Pseudomonas* sp, and *Salmonellae*, other than *pullorum*, were more resistant to the germicidal solutions tested, it was decided to extend this investigation to the study of other compounds which might serve the dual purpose of removing *Salmonella* and other organisms from the shell of hatching-eggs and control bacterial rots in stored eggs. At the same time the opportunity was taken of testing the susceptibility to such compounds of a strain of *Staphylococcus albus* isolated from an outbreak of omphalitis (mushy chick disease).

Work in progress at this laboratory has indicated that a number of the organisms normally present in the faeces of the healthy fowl are capable of interfering with the development of the chick and embryo when they gain access to the yolk and other embryonic fluids. In the case of the chick, infection of the yolk with these organisms results in local inflammation and denaturation of the yolk proteins (which are rendered unavailable for nutrition)—ultimately causing devitalisation and death of the chick. These organisms originate on the shell of the egg, where they are found in large numbers even when the eggs appear to be unsoiled. It is probable that certain factors in storage and incubation may also play a part in the pathogenesis of the condition. It was decided, therefore, also to determine the resistance of these organisms to the concentrations of certain of the germicides shown to be effective in the destruction of *Salmonellae* and *Staphylococci*.

Since *Pseudomonas* sp. were found to be more resistant to the action of germicides than *Salmonellae*, preliminary screening tests were carried out using eggs contaminated with *Pseudomonas schuylkillensis chester*. A total of 37 chemical compounds in varying dilutions were tested for their action against *Pseudomonas*. In the case of 28 of these compounds, complete sterilisation of the shell was not obtained in the highest concentration used. Only the remaining nine compounds which had given promising results against *Pseudomonas* were tested for their efficiency against *Salmonellae* and *Staphylococci*. It is only fair to point out, therefore, that some or even all of the 28 discarded compounds may have been effective against these latter organisms. It should also be borne in mind that the concentrations found to be effective in the removal of *Salmonellae* and *Staphylococci* were lower than those used in the *Pseudomonas* tests. The work on the control of *Pseudomonas* rots in stored eggs is still under investigation.

Methods

(1) *Salmonella*

The techniques for inoculation, recovery and identification of *S. pullorum*, *S. thompson* and *S. typhi-murium* were those described by Lancaster *et al.* (*loc. cit.*).

(2) *Staphylococcus*

Fresh clean eggs were infected by immersion into a 1 in 6 suspension of an overnight broth culture of *Staph. albus*, and left to dry at room temperature for three to four hours. After dipping, the whole egg was placed into a screw-capped jar of peptone broth containing 10 per cent. sodium chloride and incubated for 24 hours at 37° C. before plating onto blood agar plates incubated for a further 48 hours at the same temperature. A smear was made from all cultures recovered and stained by Gram's method. All smears showing the presence of gram-positive *Staphylococci* were regarded as positive recoveries. It is appreciated that with this method, cultures regarded as positive may have included other *Staphylococci* than that used for the inoculum. Detailed identification would have been time-consuming and this method was considered to be sufficiently accurate for the purpose of these tests.

(3) *Faecal-type organisms*

Four organisms were used for these tests, each of which had been frequently recovered from chicks which had died from yolk sac infection. These organisms were (i) *E. coli* (Eikmann positive strain), (ii) *Str. faecalis*, (iii) *Proteus morganii* and (iv) *E. coli* (atypical capsulated species). Eighteen-hour broth cultures were prepared from each of the organisms and an inoculum of 0.02 ml. of each culture was placed on the surface of a number of clean eggs which were then exposed to the atmosphere for three hours to dry. After dipping, the whole egg was placed in a jar of peptone broth and incubated at 37° C. for 24 hours. Contaminated broths were sub-cultured on MacConkey agar and any growth obtained from the control broths from infected undipped eggs.

(4) *Dipping*

The contaminated eggs were immersed for 15 minutes in the various germicidal solutions, the temperature of the solutions being maintained at 25° C. After immersion the eggs were left to drain at room temperature for three hours before being cultured. In the testing of *S. pullorum* and *Staph. albus* a total of 50 contaminated eggs were immersed in each of the nine disinfectants during three replicated tests. In the case of *S. thompson* and *S. typhi-murium*, a total of 25 eggs were used for each disinfectant over two tests. Eggs contaminated with the four faecal-type organisms were tested against only six of the germicidal solutions; three disinfectants, numbers 4, 6 and 9, having been discarded for reasons to be discussed later. These eggs were dipped in the six solutions in groups of ten and each test was replicated six times. Groups of artificially infected but undipped eggs were included as controls to each test. The results are shown in Table I (overleaf).

(5) *Successive immersions*

The stability of the nine disinfectants used was studied by immersing successive groups of 10 naturally clean eggs artificially contaminated with either *S. thompson*, *Staph. albus* and *Proteus morganii* in a solution containing double the percentage of disinfectant used in the single dip tests. These three

TABLE I

SINGLE DIPPING OF ARTIFICIALLY INFECTED EGGS

Compound No.	Germicide	Per cent. concentration	*Staph. albus*	*Salm. pullorum*	*Salm. typhimurium*	*Salm. thompson*	*E. coli*	*Proteus morganii*	Capsulated coliform	*Str. faecalis*
1	Sodium pentachlorophenate (Santobrite)	0·25	3/50	0/50	0/25	1/25	2/60	6/60	5/60	5/60
2	Phenyl mercury ethylenediamine tetra acetate (P. M. Versene)	0·13	4/50	0/50	0/25	0/25	2/60	8/60	1/60	1/60
3	An Alkyltrimethylammonium halide (plus detergent) (Deogen)	3·5	1/50	0/50	0/25	2/25	4/60	4/60	4/60	0/60
4	A Tetra-alkyl ammonium bromide (plus detergent) (Novamine)	3·0	0/50	0/50	0/25	0/25	—	—	—	—
5	Para-octylphenoxyethyl benzyl diethyl ammonium chloride (Octaphen)	0·4	0/50	0/50	0/25	1/25	3/60	3/60	2/60	0/60
6	Potassium 8-hydroxyquinoline sulphate (P.H.S.)	0·7	0/50	0/50	2/25	0/25	—	—	—	—
7	10 per cent. Cetyltrimethyl ammonium bromide (Cetavlon)	3·0	0/50	0/50	0/25	1/25	0/60	4/60	4/60	0/60
8	Phenyl mercuric diaphthylmethane disulphonate (Penotrane)	0·05	5/50	0/50	0/25	1/25	1/25	1/60	0/60	0/60
9	50 per cent. Alkyldimethyl-benzyl-ammonium chloride (Germ-i-tol)	1·5	0/50	0/50	1/25	0/25	—	—	—	—
10	Undipped infected control eggs	—	90/90	246/250	45/45	45/45	60/60	60/60	60/60	60/60

NOTE.—The denominator shows the number of eggs dipped and the numerator the number of eggs from which the organisms under test were recovered.

organisms were chosen for the successive immersion since initial tests indicated their greater resistance to the compounds tested. The temperature of the solution was again maintained at 25° C. and the dipping time at 15 minutes. The first dip after which the organism concerned was isolated was regarded as the end point of that disinfectant. Undipped artificially infected eggs served to control each successive dip. As in the single dip tests, *Proteus morganii* was only tested against six disinfectants. The results are shown in Table II.

(6) *Hatchability test*

In order to test the possible effect of dipping on hatchability, groups of 100 fertile eggs in two groups of 50 each were immersed in each of the solutions by the method described in paragraph 4. In these tests all compounds were used at double the effective strength used for successive dips or four times the strength used for single dipping. All eggs which failed to hatch, and infertile eggs, were examined after having been broken out. The results are shown in Table III (overleaf).

(7) *Organoleptic tests*

Since infertile eggs may be used for human consumption, usually in the confectionery and baking trade, it is essential that there should be no tainting of the egg contents by the germicidal compounds. Groups of 20 eggs each were immersed in the nine compounds at the concentration used for successive dipping. All groups were retained at room temperature for 14 days then placed in a cold room at 0° C. while being tested over a period of seven days.

TABLE II

STABILITY OF GERMICIDES TESTED BY THE SUCCESSIVE IMMERSION OF ARTIFICIALLY INFECTED EGGS

Compound No.	Germicide	Per cent. concentration of dip	Number of immersions before recovery or test organisms		
			Staph. albus	*Salm. thompson*	*Proteus morganii*
1	Sodium pentachlorophenate	0·5	>30	>30	>30
2	P. M. Versene	0·26	4	3	6
3	Deogen	7·0	15	16	16
4	Novamine	6·0	1	1	—
5	Octaphen	0·8	>30*	>30	>30
6	Potassium 8-hydroxyquinoline sulphate	1·4	12	11	—
7	Cetavlon	6·0	12	11	14
8	Penotrane	0·1	4	3	6
9	Germ-i-tol	3·0	15	14	—
10	Undipped infected control eggs *	—	10/10	10/10	10/10

* The results are those for the control eggs to the last effective dip in each case.

TABLE III
HATCHABILITY OF DIPPED EGGS

Hatch number	Compound number	Germicide	Per cent. concentration of dip	Number of eggs set	Number of eggs fertile	Number of dead embryos	Per cent. of fertile eggs hatched
1	1	Sodium pentachlorophenate	1·0	100	86	9	89·53
		Undipped controls	—	100	78	9	88·46
2	2	P. M. Versene	0·55	100	82	6	92·58
		Undipped controls	—	100	85	7	91·76
3	3	Deogen	14·0	100	71	10	85·91
	4	Novamine	12·0	100	85	8	90·58
		Undipped controls	—	100	85	12	85·88
4	5	Octaphen	1·4	100	82	11	86·58
	6	Potassium 8-hydroxyquinoline sulphate ...	2·8	100	78	11	88·46
		Undipped controls	—	100	88	9	89·77
5	7	Cetavlon	12·0	100	82	9	89·02
	8	Penotrane	0·4	100	86	7	91·86
		Undipped controls	—	100	77	8	89·61
6	9	Germ-i-tol	6·0	100	78	33	57·69
		Undipped controls	—	100	84	21	75·00

Undipped control groups were similarly treated. The dipped and control eggs were submited to the Low Temperature Research Station, Cambridge, who kindly carried out the flavour tests. The eggs were lightly boiled, each group in a separate saucepan, and the white and yolk tasted separately. The scoring system employed was that described by Bate-Smith, *et al.* (1943). The mean flavour scores are shown in Table IV.

Results

(1) *Single dip test*

In Table I are shown the various compounds tested, designated under their technical terms and, where known, by the trade name under which they are marketed in this country. In subsequent tables and in the Discussion the trade names only will be used in order to avoid tedious repetition of unwieldy terms. Where the trade names are shown, the compounds were used in the form in which they are marketed. Compound No. 1, sodium pentachlorophenate, was used in the pure form in these tests; however, a technical grade of this chemical is now marketed in this country under the trade name of Santobrite. In two instances (compounds No. 2 and 6) the material was prepared specially by the firm of manufacturing chemists concerned and by whom the term P.M. Versene was coined for convenience' sake in referring to No. 2 (Phenyl mercury Ethylene-diamine tetra acetate); compound No. 6 (Potassium 8-hydroxyquinoline sulphate) has apparently neither trade name nor abbreviated description, and is referred to as P.H.S.

It will be seen from Table I that all nine compounds gave complete sterilisation of the shells of eggs contaminated with *S. pullorum*. All except two, P.H.S. and Germ-i-tol, gave complete sterilisation of shells of eggs artificially infected with *S. typhimurium*. Four compounds—P.M. Versene, Novamine, P.H.S. and Germ-i-tol—gave complete sterilisation of the shells of eggs infected with *S. thompson*. Five—Novamine, Octaphen, P.H.S., Cetavlon and Germ-i-tol—gave complete sterilisation of shells contaminated with *Staph. albus*. Even in those instances where complete sterilisation of all infected eggs was not obtained, the recovery rate was remarkably low. Only six of the compounds were tested for their efficiency against the faecal-type organisms. All gave a fairly satisfactory measure of control but Penotrane appeared to be slightly superior to the others in this respect. It will be noted that in practically all instances the infected undipped control eggs showed 100 per cent. recovery of the organism in question from the shells of the infected eggs; the

TABLE IV
FLAVOUR OF DIPPED EGGS

Test No.	Compound No.	Germicide	Per cent. concentration of dips	Flavour Score	
				White	Yolk
1	1	Sodium pentachlorophenate	0·5	7·8	7·9
	2	P. M. Versene	0·26	7·6	7·6
	5	Octaphen	0·8	7·7	7·8
		Undipped controls	—	7·6	7·7
2	3	Deogen	7·0	7·8	7·8
	4	Novamine	6·0	7·6	7·5
		Undipped controls	—	7·9	8·0
3	6	Potassium 8-hydroxyquinoline sulphate	1·4	6·2	6·7
		Undipped controls	—	7·9	8·0
4	7	Cetavlon	6·0	7·5	7·5
		Undipped controls	—	7·8	7·6
5	8	Penotrane	0·1	7·6	7·3
	9	Germ-i-tol	3·0	6·5	6·0
		Undipped controls	—	7·7	7·8

only failure to recover the organism being in the case of four out of 250 eggs artificially infected with *S. pullorum*. From the results shown in Table I, there would appear to be little or no significant difference in the comparative efficiency of the type of compounds tested when used as a single dip. However, when subsequent tests on stability and on flavour and hatchability of the eggs were taken into account, a somewhat clearer picture was obtained.

(2) *Successive dips*

Stability

Table II shows the results of dipping successive groups of artificially infected eggs with the compounds tested, and in the manner described under Method, paragraph 5. The figures shown under the organisms tested are those for the last dipping at which complete sterilisation of the shells of all infected eggs within that group was obtained. Since at each successive immersion 10 artificially infected clean eggs were used, and each successive dip was controlled by the use of 10 artificially infected undipped eggs, it will be seen, in the case of compound No. 1, for example, that 300 artificially infected eggs were tested after dipping. The results in Table II, therefore, confirm those obtained in Table I, since at any particular immersion up to that shown in the table, the group of eggs infected with the organism shown, and using the dip at the double strength, gave complete sterilisation of significantly large numbers of infected eggs. Again, as in Table I, *Proteus morganii* was only tested against six compounds. In the case of compound No. 1 (Santobrite) and compound No. 5 (Octaphen) complete sterilisation of all infected eggs was still obtained after 30 successive immersions. Since it was considered that this is the largest number of immersions likely to be carried out commercially on any one day no further testing was attempted. It will also be seen from the table, that compounds No. 4 (Novamine), 2 (P.M. Versene), and 8 (Penotrane) were relatively unstable in that only one to three successive dips could be carried out before recovery of the organisms tested could be obtained from the dipped eggs. There was little difference between the compounds No. 3 (Deogen), 6 (P.H.S.) and 9 (Germ-i-tol), all of which were effective for between 11 to 15 successive immersions.

(3) *Hatchability of dipped eggs*

In the hatchability tests, the compounds under trial were used at twice the strength shown in the successive immersions, since it was felt that a margin of error should be allowed for in the commercial use of the germicides. Groups of 100 eggs at a time were incubated together; each hatch being controlled by 100 undipped eggs. Owing to the limited space available in the incubator, hatches had to be carried out at different times, but in each case controls were included. It will be noted from the last column of Table III that only one compound (Germ-i-tol) appeared to have any detrimental effect on the hatchability of dipped eggs when compared with the related controls. In all other instances, the dipped eggs showed as high, and in four cases a slightly higher, hatchability of fertile eggs than was obtained in the undipped control eggs. In all cases, eggs classified as infertile on candling test, and eggs which appeared to contain dead embryos or dead-in-shell chicks were confirmed by breaking out the eggs and examining the contents. The test with Germ-i-tol was repeated, using the compound at a lower concentration, but again there was a significant decrease in hatchability when compared with the controls.

(4) *Effect on flavour of dipped eggs*

The method of tasting dipped eggs has already been referred to, and in assessing the results it should be noted that according to Brooks (1953) " any group of eggs that give flavour scores less than the corresponding controls might be suspected as having been affected by the treatment to some degree. If the difference between the scores of a given group and its control amounted to 0.5 suspicion would be a strong one, and if the difference was greater than that it should be concluded that the group had been affected. A flavour score of seven is defined in this score system, as denoting a barely detectable off-flavour or foreign flavour." It will be seen from Table IV that on this basis, compounds No. 6 (P.H.S.) and 9 (Germ-i-tol) would have to be discarded as having had a definite effect on the flavour of the eggs; P.H.S. produced a definite foreign flavour, while Germ-i-tol produced a bitter flavour in both the white and yolk. Not only were the eggs dipped in this latter material bitter but they left a bitter after-taste. The results with compounds No. 4 (Novamine) and 8 (Penotrane) were borderline but probably not significant.

Conclusions

The nine compounds tested all gave a fairly effective control of eggs artificially infected with a variety of organisms responsible for egg-borne disease in the chick. Further tests, however, indicated that one of the compounds, Germ-i-tol, could not be used on hatching eggs at the concentration shown since it produced a detrimental effect on hatchability. One further compound, Potassium 8-hydroxyquinoline sulphate, would be similarly unsuitable since together with Germ-i-tol it gave rise to a noxious flavour in the dipped eggs; while two further compounds, Novamine and Penotrane, were borderline in this respect. Novamine, Penotrane and P.M. Versene would appear to be unsuitable in view of their instability when used at the concentrations employed for successive immersions.

Based on these findings, four compounds, Santobrite, Deogen, Octaphen and Cetavlon, appear to be superior to the others and give highly satisfactory results, both as single and repeated dips without exerting any detrimental effect on hatchability or flavour. Of these four, Santobrite and Octaphen were somewhat superior in their action in that they could both be used for at least 30 successive immersions, whereas in the case of Deogen and Cetavlon, recovery of the organisms concerned was obtained after 15 and 11 immersions respectively.

During the past two years, the dipping of eggs in germicidal solutions in the manner described—particular care being taken as to the final concentration of the dip to be used and the maintaining of the

dipping solution at a temperature higher than that of the egg, *i.e.*, approximately 80° F.—has been advised in a number of instances where outbreaks of Salmonellosis or infected yolk sacs have been encountered in the field. Although it is difficult to assess the value of such field trials, the opinion of the breeders and hatcheries concerned—arrived at on purely empirical grounds—has been that dipping has been highly effective in controlling such outbreaks.

There is little doubt from the records of our routine diagnosis service that outbreaks of *Salmonella* infections, particularly in turkey poults, have increased during the last few years and investigations would indicate that *Staphylococci* and faecal-type organisms may be responsible for either a greater number of outbreaks of infected yolk sacs or of decreased hatchability than has hitherto been suspected. For the reasons given in the Introduction to this paper, it is considered that the dipping of eggs may play an important part in the control of such outbreaks. Although formaldehyde fumigation and the use of disinfectants such as sprays, fogs and aerosols in the hatchery premises may be a valuable means of controlling infection in the environment, it can be argued, on the evidence of work with *Pseudomonas* sp. in the occurrence of bacterial rots, that by the time the eggs are collected and transferred to the hatchery premises, organisms contaminating the outside of the shell may have already penetrated to sites inaccessible to these germicides. There would appear to be a place, therefore, for a simple method, capable of being carried out on the breeding farm, of sterilising the outside of the shells of hatching eggs contaminated by infected faeces. Such a method would be the use of germicidal dips of the type tested, and using the methods outlined.

The advice so far given for the field use of these compounds has been that the eggs should be collected in, or transferred to, wire baskets which are then lowered into metal containers larger than the basket and containing the germicidal solution at the required temperature—*i.e.*, approximately 80° F. The basket should then be rotated once or twice and after 15 minutes immersion hung up above the container to drain for a period of about three hours before the eggs are trayed or boxed. Where repeated dipping is carried out it may be necessary to reheat the dip before re-use, and where large numbers of eggs are involved it may be advisable to employ an immersion heater or similar apparatus to maintain the solution at the required temperature. Approximately 50 eggs can be immersed in 1 gallon of solution, and if used for 10 successive dips 500 eggs can be dealt with per bucket. A preserving pail is suitable for this purpose, but on larger farms specially constructed tanks have been employed incorporating heating devices. Where eggs are dipped within an hour or so of collection, the majority of eggs, even those heavily soiled, will require little or no further cleaning, although slight stains can be removed by wiping the stained portion with cotton wool dipped in the germicide and discarded after use. Where dipping is not carried out until the end of the day, although most of the faeces will be removed, some slight staining may remain. Some of the germicides tested were known to contain a detergent and it is possible that in the case of the others that the addition of a detergent would enhance their cleaning and sterilising value.

Summary

(1) Sodium pentachlorophenate (Santobrite) and Paraoctylphenoxyethyl benzyl diethyl ammonium chloride (Octaphen) at concentrations of 0.5 and 0.8 per cent. respectively effectively sterilised the shells of eggs artificially contaminated with certain *Salmonella* and faecal type organisms for 30 successive immersions; the dipping fluid being retained at a temperature of 25° C. and the eggs being immersed for 15 minutes.

(2) An alkyl trimethylammonium halide (plus detergent) (Deogen), and a 10 per cent. cetyltrimethyl ammonium bromide (Cetavlon), were similarly effective for 15 and 11 successive immersions.

(3) Phenyl mercury ethylenediamine tetra acetate (P.M. Versene) and Phenyl mercuric-dinaphthylmethane disulphonate (Penotrane) were effective for only three successive immersions.

(4) Tetra alkyl ammonium bromide (plus detergent) (Novamine) was effective for only one immersion.

(5) None of the above compounds had any detrimental effect on either flavour score of dipped eggs or on hatchability of dipped fertile eggs, although Novamine and Penotrane were borderline in this respect.

(6) Potassium 8-hydroxyquinoline sulphate had a detrimental effect on flavour score and in addition stained the shells a light yellow colour. Fifty per cent. Alkyldimethyl-benzylammonium chloride (Germ-i-tol) adversely affected both flavour score and hatchability of dipped eggs.

Acknowledgments.—We are grateful to the following manufacturers for their co-operation and for supplying the various compounds tested:—

Fine Organics Inc., Milton Antiseptic Ltd., Walter Gregory & Co., Ltd., Ward Blenkinsop & Co., Ltd. and Smith & Nephew Research Ltd. We acknowledge the assistance of Mr. C. G. Stacey in supplying the large number of eggs used in this investigation, and also the technical assistance of Miss G. Armstrong. The work was carried out with the assistance of a grant from the Agricultural Research Council.

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News and Comment

PROFESSOR LAMONT HONOURED

At the quarterly meeting of the Council of the R.C.V.S., held at Red Lion Square on January 6th the President, Mr. H. Sumner, on behalf of the Council, presented the John Henry Steel Memorial medal to Professor H. G. Lamont. In making this presentation, Mr. Sumner said: "You will recollect that this medal was founded in 1892 in memory of John Henry Steel 'to perpetuate the memory of an earnest worker so that his example may incite others, and to benefit the profession by encouraging and rewarding merit.' The medal is, in fact, voted by the Council as a reward for scientific or literary work of merit connected with the profession, and only Fellows or Members of this Royal College are eligible for the award.

"Since 1897, when the medal was first awarded to two men, whose portraits look down on you to-day, Sir John McFadyean and Major-General Sir Frederick Smith, it has only been awarded 24 times in the 58 years; yet this short list is entirely composed of names that are known and remembered with esteem in the profession."

Having reviewed Professor Lamont's scholastic attainments, the President went on: "His career in research has been equally distinguished since his first appointment in 1924 as Laboratory Officer in the Imperial Secretary's Department at the pathological laboratory of Queen's University, and has culminated in his present appointment of Director of Veterinary Research in the Ministry of Agriculture for Northern Ireland. Yet, whilst engaged in research and in the administration required from a Government servant, he has found time to acquire high academic qualifications.

"The esteem in which he is held in academic circles is shown by the fact that having since in 1931 been a lecturer in both Veterinary Science and Dairy Bacteriology in Queen's University, he was in 1947 appointed Reader in Veterinary Science and subsequently, in 1951, Professor of Comparative Pathology in that University.

"We at the Royal College have valued the assistance which he has given the cause of veterinary education as an examiner for the Diploma of M.R.C.V.S. We are equally aware of his great labours for veterinary science in papers before various congresses and learned bodies and in membership of various committees, particularly of the Agricultural Research Council. It was a great joy to us all when we knew that in 1950 he was made an Officer of the Order of the British Empire.

"Hubert Lamont is indeed an earnest worker, and not only is he that, but he has that indefinable, indescribable quality that leads others to follow in his footsteps. As a result of his generosity and help to others he is the captain of a team of workers in Northern Ireland whose contributions to the profession have been such as to make their reputation not nation wide but world wide. Their help and their wisdom have brought solace and comfort to veterinarians all over the world. It is therefore fitting and with very great personal pleasure that I ask him to come forward and receive the John Henry Steel Medal." (*Applause.*)

Professor Lamont replied: "May I say thank you very much indeed for the very great honour which you have done me. I am quite overcome with what the President has said, but I thank you from the bottom of my heart."

THE R.C.V.S. COUNCIL

At the quarterly meeting mentioned above the President welcomed Professor K. E. Cooper, PH.D., B.SC., M.R.C.S., L.R.C.P., who had been appointed by the University of Bristol as its representative in succession to the late Professor Blakemore.

MEETING FOR CLINICIANS

The Animal Health Division and the N.A.A.S., in conjunction with the Middlesex branch of the N.F.U. and the County Council Smallholdings Committee, have arranged a meeting on foot-and-mouth disease and swine fever to which members of the profession are warmly invited. The meeting is to take place on January 18th at 8 p.m. in the Chequers Hotel, Uxbridge, under the chairmanship of Mr. C. H. Knifton.

The subjects, which include a film on foot-and-mouth disease, will be introduced by Mr. H. G. Silcock, Divisional Veterinary Officer for Middlesex, Herts and London, and a discussion will follow.

UNIVERSITY NEWS

Cambridge

The University of Ghent invited Professor W. I. B. Beveridge to give a lecture at the Veterinary School on December 23rd, 1955. The title of the lecture was "Virus Pneumonia of Pigs." The lecture was followed by a seminar on pig diseases.

The following have passed the first part of the Veterinary Examination:—

A. B. Carles, Pembroke College; J. D. Jemson, Sidney Sussex College; *J. M. King, St. John's College; M. A. E. Rex, Gonville & Caius College; D. B. Ross, Trinity College; M. M. H. Sewell, Trinity Hall. D. L. Kingsberry (Magdalene College) has passed one section of the second part of the Veterinary Examination.

* Special merit.

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POULTRY PREMISES AND VEHICLES (DISINFECTION) ORDER, 1956

Investigations and enquiries made into outbreaks of fowl pest that occurred at the end of 1955 and previously have produced overwhelming evidence that the continuing spread of infection in many parts of England and Wales is associated directly or indirectly with the activities of a comparatively few poultry dealers and slaughterers who handle live or dead poultry in the process of distribution. The condition and standards of cleanliness of their premises and equipment and vehicles have been found to be very unsatisfactory, and there are strong grounds for believing that infection is transmitted from such sources to farms.

In order to deal with the situation, the Minister and the Secretary of State for Scotland, acting jointly, and after consulting the various national poultry trade, producer and local authority organisations and other interests likely to be concerned, have made a new Order (The Poultry Premises and Vehicles (Disinfection) Order, 1956). The Order came into operation on January 12th and empowers veterinary inspectors of the Ministry and inspectors of Diseases of Animals Local Authorities to serve notice where it is considered necessary, requiring the premises (including street traders' stalls) equipment and vehicles of poultry dealers and slaughterers to be disinfected in such manner as may be prescribed and at the expense of the person on whom the notice is served; in default, the work may be done by the appropriate authorities who may recover the cost from the dealer or slaughterer concerned. The Order also provides that premises so required to be cleansed and disinfected may not be used for poultry trading until that work has been carried out to the satisfaction of the appropriate authorities.

BLOOD TESTING AND JOHNE'S DISEASE

We are asked to state that the work on the complement fixation test and Johne's disease carried out at the Weybridge Laboratory of the Ministry is still essentially experimental, and is not a routine service. Weybridge is prepared to assist veterinary surgeons with individual tests necessary to aid clinical diagnosis, tests for export purposes, and in certain cases for sale purposes. Tests on herds or large batches of samples cannot be undertaken without prior arrangement, and will only be considered where some definite attempt at eradication is visualised.

PERSONAL

Birth

GIBSON.—On Hogmanay, to Helen (*née* Mitchell, M.R.C.V.S.), wife of W. W. C. Gibson, B.SC., M.R.C.V.S., "Mayfield," Great Hales Street, Market Drayton, a daughter.

KERR.—At 112, Corve Street, Ludlow, on January 9th, 1956, a son, brother for Seamus and Carol.

R.C.V.S. OBITUARY

We record with regret the death of the following member of the profession:—

NICOL, John, 32, Smuts Road, Selborne, East London, South Africa. Major S.A.V.C. (R. of O.). Graduated May 25th, 1910, Edinburgh. Died November 24th, 1955, aged 69 years.

DR. JAMES STEWART

Dr. D. I. Nisbet writes:—

As was announced in THE VETERINARY RECORD of December 31st, the death of Dr. James Stewart occurred in Edinburgh on December 26th.

Dr. Stewart, who was a leading authority on metabolic and deficiency diseases of farm animals, was the head of the Biochemical Department of the Animal Diseases Research Association at Moredun Institute, Edinburgh, a position which he had occupied since 1936.

He was born in Aberdeen, and graduated M.A., B.Sc., from Aberdeen University in 1924. His first appointment after graduation was to the staff of the Rowett Research Institute, Aberdeen, where he worked on the problem of the relationship of the poor pasture of the Scottish hills to the incidence of various bone and marasmic diseases of sheep.

In 1925 he went to Cambridge University, at first on the staff of the Animal Nutrition Institute, and then in 1926 as Biochemist at the Institute of Animal Pathology. During his tenure of the latter post, until 1936, he investigated the biochemistry of a number of the common diseases of farm animals, including the effects of the toxins produced in lamb dysentery and pulpy kidney disease, and the toxicology of plants poisonous to livestock.

In 1926 the degree of Doctor of Philosophy of Cambridge University was awarded to him for a thesis entitled "The Effects of High Protein diets on Sheep," and in 1934 he received the degree of Doctor of Science of Aberdeen University for a thesis on the effects of nematode infestations on the metabolism of the host.

In 1937 he was elected a Fellow of the Royal Society of Edinburgh, and in 1944 he was elected a Fellow of the Royal Institute of Chemistry of Great Britain.

Much of Dr. Stewart's earlier researches into the problems of nutritional diseases in ruminants was carried out at a time when such work was of pioneer nature, and his contributions to the knowledge of these diseases evoked world-wide interest. One of the most important results of his work was the control of pine in sheep due to cobalt deficiency by the administration of cobalt and by the use of cobalt-rich fertilisers. His more recent investigations covered a wide range of nutritional diseases, foremost amongst these being hypomagnesaemia, phosphorus deficiency, and the relationship between low levels of vitamin A in colostrum and white scour in calves.

The esteem in which he was held is shown by the fact that he was chosen as a member of the United Kingdom delegation to the Specialist Conference in Agriculture "Plant and Animal Nutrition in Relation to Soil and Climate Factors" held in Australia in 1949, and by the large number of appointments which he held on committees of such bodies as the Agricultural Research Council and the Department of Agriculture for Scotland.

Field experiments were carried out under Dr. Stewart's direction in almost every county in Scotland, and as a result he had a most extensive know-

ledge of the various methods of sheep and cattle husbandry in Scotland, and of the associated disease problems encountered by stockowners throughout the country. He was always very willing to draw on this vast fund of knowledge for the benefit of others whose experience was more limited.

He will be sadly missed by his many friends and colleagues, and our sympathy goes out to his wife and children in their great loss.

COMING EVENTS

January, 1956

19th (Thurs.). Ordinary General Meeting of the South-Eastern Division, B.V.A., at the Royal Star Hotel, Maidstone, 2.30 p.m.

20th (Fri.). General Meeting, S. E. Midlands Division, Franklin's Garden Hotel, Northampton, 8 p.m.

24th (Tues.). Winter Meeting of the North of Scotland Division, B.V.A., in the Northern Hotel, Aberdeen, 2.30 p.m.

26th (Thurs.). Meeting of the Western Counties Division, B.V.A., at the Rougemont Hotel, Exeter, 2 p.m.

26th (Thurs.). Annual Dinner and Dance of the Victoria Veterinary Benevolent Fund, Northern Division, at Northern Hotel, Aberdeen, at 7.30 p.m.

27th (Fri.). A Special General Meeting of the North of England Division, B.V.A., in Agricultural Lecture Room, King's College, Newcastle upon Tyne, at 2.30 p.m.

February

3rd (Fri.). Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, Portland Place, London, W.1, 10.30 a.m., to receive further articles on calf diseases.

10th (Fri.). Annual Ball of the Glasgow University Veterinary Medical Association in the Rhul Restaurant, Sauchihall Street.

17th (Fri.). Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m.

22nd (Wed.). Second Meeting of the A.V.T. and R.W's. Scottish Regional Group for the 1955-56 session in the Moredun Institute, Edinburgh, 2.15 p.m.

B.V.A. COUNCIL AND COMMITTEE MEETINGS IN LONDON

Wednesday, January 18th, 1956

10.30 a.m.—Home Appointments Committee, at 7, Mansfield Street, W.1.

12.00 noon—Parliamentary and Public Relations Committee at 7, Mansfield Street, W.1.

2.15 p.m.—Organising Committee, at 7, Mansfield Street, W.1.

Thursday, January 19th, 1956.

10.00 a.m.—Veterinary State Medicine Committee, at 7, Mansfield Street, W.1.

12.00 noon—Finance Sub-committee, at 7, Mansfield Street, W.1.

2.15 p.m. General Purposes and Finance Committee, at 7, Mansfield Street, W.1.

Friday, January 20th 1956.

10.30 a.m.—Meeting of Council at Connaught Rooms, Great Queen Street, W.C.2.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Aberdeen. Leyton, Balmedie (Jan. 3).

Essex. Maldon Hall, Maldon (Dec. 29).

Kent. Court Lodge Farm, Willesborough, Ashford (Jan. 29).

Lanarks. Dechmont Farm, Cambuslang, Glasgow (Jan. 4).

Yorks. Hoyle Home Farm, Hove Edge, Brighouse (Jan. 4).

Fowl Pest

Berks. Rosery Cottage, Evendons Lane, Wokingham (Dec. 31); Belmont Cottage, Finchampstead Road, Wokingham; 224, Finchampstead Road, Wokingham (Jan. 3); Chapel Green Farm, Luckley Road, Wokingham; Murrell Hill Farm, Binfield, Bracknell (Jan. 4).

Brecon. Neuadd Wen, Partrishow (Dec. 31); 13, Velindre, Talgarth; Dower House, Partrishow, Crickhowell (Jan. 3).

Cambs. Westry Farm, Wisbech Road, March (Jan. 3).

Carmarthen. Pare Beach, Cwmdu, Llandilo; Tycanol, Five Roads, Llanelly (Dec. 31); Stangrach, Llanfynydd; Coynant Farm, Llanfynydd (Jan. 5).

Essex. Dunton Poultry Farm, Bulpham, Upminster (Dec. 29); Avondis, Lower Dunton Road, Bulpham, Upminster (Dec. 30); Clyde Lodge, Lower Dunton Road, Bulpham, Upminster (Dec. 31); Ainesgreen Piggery, Gelly Hill, Waltham Abbey (Jan. 1); Common Farm, Ramsden Heath, Billericay (Jan. 2); 24, Straight Road, Boxted, Colchester (Jan. 3); Orchard Leigh, Langham Road, Boxted, Colchester; Heathcote, Langham Road, Boxted, Colchester; 27, Straight Road, Boxted, Colchester (Jan. 4).

Glamorgan. Seabanks Farm, Rumley, Cardiff (Jan. 3); 2, School Cottages, Cimla, Neath (Jan. 5).

Hereford. Cayo Farm, Wormbridge (Dec. 30); Little Elms. Wynns Green, Burley Gate; 56, Venns Lane (Jan. 3).

Lancs. Moorfields Farm, Moss Lane, Little Hoole, Preston; Homer House, Liverpool Road, Bretherton, Preston (Dec. 30); Rose Villa, Hall Carr Lane, Longton, Preston; Southlands Poultry Farm, Warton, Preston (Dec. 31); Farrels Farm, Grange Lane, Hutton (Jan. 1).

Leics. Tudor House, Manor Road, Great Bowden, Market Harborough (Dec. 31); 38, Leicester Lane, Great Bowden, Market Harborough (Jan. 5).

Monmouth. No. 2 Rumble Street, Monkswood, Usk; The Lawns, Grosmont, Hereford; The Farm, Skenfrith, Abergavenny; Lower Berthllwyd, Bettws Newydd, Usk; Castle View, Raglan; Nos. 2 & 4 Holding, Llandewi Court, Llandewi, Skirrid, Abergavenny (Dec. 29); Little Pant, Llanellin, Abergavenny; Hartridge Farm, Llanwern, Newport (Dec. 31); Priory Farm, Newchurch, West Chepstow; Fforddlas, Fforest, Coalpit (Jan. 3).

Norfolk. East Bilney Poultry Farm, East Bilney, Dereham; Holmlea, Cherrytree Road, Tibenham, Norwich; Paper Street, Yaxham, Dereham (Dec. 30); The Poplars, Croxton Road, Fulmodestone, Dereham; The Hastings Arms, Fulmodestone, Dereham (Jan. 3).

Staffs. Oak Farm, Needwood, Burton-on-Trent (Dec. 30); 21, Wrottesley Park, Tettenhall, Wolverhampton; 29, Richard Street, Wolverhampton (Jan. 2).

Suffolk. Lawn Farm, Mutford, Beccles (Dec. 30); The Poultry Farm, Elvedon, Thetford (Jan. 2); "Galna," Beccles Road, Mutford (Jan. 3).

Surrey. Brook Farm, Hook Road, Surbiton (Dec. 31).
Sussex. Ponswood Estate Allotments, St. Leonards (Dec. 31).
Warwick. Weston Hall Farm, Weston-under-Wetherley, Leamington Spa (Jan. 3).
Worcs. Springhill, Alfrick (Jan. 3).

Swine Fever

Bucks. Corner Field, Hollybush Lane, Denham, Uxbridge (Jan. 9); Ashbridge Farm, Ley Hill, Chesham; Church Farm, Church Road, Iver Heath (Jan. 10).
Cambs. Stocking Grove, Chatteris (Jan. 9).
Dorset. Woodbridge Farm, Holwell, Sherborne (Jan. 9).
Hants. Browning Hill Farm, Baughurst, Basingstoke (Jan.9).
Herts. New Barnes Farm, Much Hadlam (Jan. 9).
Kent. No. 1 Bush Road, Cuxton, Rochester (Jan. 3); Whitehouse Farm, Higham, Rochester (Jan. 4); Abbey Farm, Higham, Rochester (Jan. 6); Dane Field, Tilmanstone, Deal (Jan. 9).
Lancs. Carr House, Windy Arbor Road, Whiston, Prescot (Jan. 2); Top o'th Hill Farm, Birch, Middleton (Jan. 10).
Norfolk. Green Farm, Weston Longville, Norwich (Jan. 2); Church Farm, Fring, Docking, King's Lynn; Chapel Farm, Swanton Morley, Dereham (Jan. 4).
Oxon. Webbs Farm, Assendon, Henley on Thames (Jan. 5).
Salop. Mayfield Farm, Arleston, Wellington (Dec. 30).
Somerset. Batch Farm, Lympsham, Weston-super-Mare (Jan. 5).
Staffs. 33, George Street, Smethwick (Jan. 3); Preston Vale, Penkridge, Stafford (Jan. 10).
Stirling. Greenbank Farm, Falkirk (Jan. 9).
Sussex. Gateshead Farm, Gatehouse Lane, Trotton, Midhurst (Jan. 3).
Worcs. Blakebrook County Hospital, Kidderminster (Jan. 3); Barnsley Hall Farm, Bromsgrove (Jan. 6).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Establishment of an International Association of Poultry Pathologists

Sir,—The amendment to the statutes of the International Veterinary Congresses of international manent Committee in May, 1955, provided for the affiliation to the Permanent Committee of the International Veterinary Congresses of International associations of veterinary specialists.

A number of such international associations already exist or are being established in the spheres of veterinary pathology, parasitology, animal production and milk and meat hygiene.

Although the main purpose of such specialist associations is to encourage closer contact and collaboration between veterinarians working in the same field, there are numerous other instances in which they could be of considerable value, *e.g.*, agreed nomenclature for certain diseases. In addition, it is the intention that such associations should assume, in consultation with the Organising Committee of each Congress, the initiative for arranging the scientific programme in their section of each International Veterinary Congress. It is also envisaged that the Organising Committee in their turn, would submit subjects received from other quarters to the specialists' associations for consideration.

Although the international specialists' associations may possibly only meet during the course of an International Veterinary Congress, the specialised group within a country or group of countries, *e.g.*, Europe or U.S.A. and Canada, could meet more frequently, or when the opportunity arose, at national congresses or conferences. In the case of the proposed International Association of Poultry Pathologists, a meeting could also be held during the course of the World's Poultry Science Congress. The following are the main principles which will govern the affiliation of international associations of veterinary specialists:—

(1) Each international association will be represented on the Permanent Committee of the International Veterinary Congress by one delegate (*Membre titulaire*). The nomination of a second delegate (*Membre adjoint*) may be considered. Each international specialists' association will have one vote.

(2) The international specialists' associations will form an integral part of the International Veterinary Congresses and will hold a meeting at the same place and time as the International Veterinary Congress.

(3) The international specialists' groups will be self-supporting and autonomous.

(4) The facilities durng the Congress with regard to meeting rooms, interpreters, etc., will be arranged through the Organising Committee of the Congress.

(5) The question as to whether a small subscription should be levied on the specialists' associations for affiliation to the Permanent Committee is under consideration.

It has been proposed that an International Association of Poultry Pathologists should be established. Dr. L. de Blieck (Holland) has been nominated as provisional President and myself as provisional Secretary.

Associations of poultry pathologists already exist in the U.S.A. and the Netherlands and it is hoped that a similar organisation can be established in the United Kingdom. A number of the profession who have been approached have indicated their interest in and willingness to support such an association and it is proposed to hold a meeting for the purpose of inaugurating a National Association of Poultry Pathologists on Friday, January 20th at 2.30 p.m. at the offices of the British Veterinary Association at 7, Mansfield Street, Portland Place, London, W.1, and to discuss the formation of the international association.

I would be grateful if those prepared to support this proposition would contact me and at the same time inform me whether they can attend the proposed meeting.

Yours faithfully,
R. F. GORDON,
Director.

Houghton Poultry Research Station,
Houghton,
Huntingdon.
January 5th, 1956.